MEMORANDUM

TO: Planning Commission

FROM: Darren Wyss, Associate Planner

RE: Public Facilities Inventory – Comp Plan

DATE: November 1, 2006

At the November 6, 2006, meeting, the Planning Commission will be presented with an overview of the Public Facilities Topic Report for the Comprehensive Plan Update. The components of the report are as follows:

Public Infrastructure
Stormwater
Wastewater
Drinking Water

Public Safety
Police Services
Fire Protection Services

Community Facilities
Parks and Recreation
Library
Schools
Government Facilities
Utilities

In addition, the Public Infrastructure topics will be discussed in more detail and a draft report is attached.

INVENTORY

STORMWATER SERVICES

The applicable rules, statutes and plans that impact stormwater services within the City include:

1. Clean Water Act
2. Oregon Revised Statute 468b: Water Quality
3. Oregon Administrative Rule 340
4. Clean Water Services MS4 Stormwater Management Plan
5. Clean Water Services Design and Construction Standards
6. Fanno Creek Watershed Management Plan
7. Tigard Community Development Code

The primary objectives of stormwater services within the City of Tigard are the protection of water quality, and flood control. To accomplish these objectives, the City collaborates with Clean Water Services (CWS) in the planning and management of the system. The plans currently used for City efforts are the CWS Stormwater Management Plan (SWMP), which addresses water quality protections, and Fanno Creek Watershed Management Plan (Fanno Plan), which addresses flood control in the City.

Stormwater
Precipitation that accumulates in natural and/or constructed storage and stormwater systems during and immediately following a storm event

Stormwater management
Functions associated with planning, designing, constructing, maintaining, financing, and regulating the facilities (both constructed and natural) that collect, store, control, and/or convey stormwater

The Stormwater Management Plan is submitted by CWS to the Oregon Department of Environmental Quality (DEQ) as a requirement of the combined National Pollutant Discharge Elimination System (NPDES) and Municipal Separate Storm Sewer System (MS4) permits. The SWMP is revised on a five-year cycle and was last updated in spring 2006. It outlines the best management practices (BMPs) that will ensure compliance with the Clean Water Act to the maximum extent practicable. To implement the plan, the City has an inter-governmental agreement (IGA) with CWS as a "self-service provider". This designation means the City has operation and maintenance authority over storm drain systems, water quality systems, and roadside ditches under City jurisdiction. The IGA outlines the CWS work program standards that must be followed by the City. Current maintenance programs are shown in Table 1-1. City stormwater infrastructure that is subject to the IGA maintenance programs can be found in Table 1-2.

The Stormwater Management Plan also follows an adaptive management process that allows CWS and the co-implementers to regularly evaluate the plan strategies. Strategies not performing as well as anticipated can be adjusted and applied to the BMPs. The changes resulting from the adaptive management are documented in annual reports to the Department of Environmental Quality.

Table 1-1. Scheduled Maintenance of Stormwater System

Program	Cycle
Video Inspection of Pipe Interiors	7 years
Roadside Ditching & Inspection	5 years
Line Cleaning & Repair	4 years
Manhole/Catch basin Inspection/Cleaning	1 year
Water Quality Facility Inspection/Maintenance	Monthly
Leaf Pickup	Seasonal

Source: CWS/Tigard IGA

The 1997 Fanno Creek Watershed Management Plan, prepared by CWS for all jurisdictions within the basin, is the principal plan for drainage in the City. The Fanno Plan covers 85% of Tigard (the remaining 15% of the jurisdiction drains directly to the Tualatin River) and has been adopted by the City. Included in the plan is an inventory of drainage structures, an evaluation of their adequacy of capacity, and recommended City infrastructure improvements to reduce flooding.

Table 1-2. City Stormwater Infrastructure

Type	Number	Size
Stormwater Pipe	n/a	113.4 miles
Catch Basins	3975	n/a
Outfalls	588	n/a
Water Quality Facilities		
Pond (wet or dry)	40	16.0 acres
Swale	23	12.1 acres
Filter System	5	n/a
Detention Tank	1	n/a
Detention Pipe	10	n/a

Source: City of Tigard Public Works

The Fanno Plan divided the recommended projects by priority, with the highest being the replacement of bridges and culverts determined to have inadequate openings underneath to pass flows of the 100-year flood. Three bridges spanning Fanno Creek and one culvert on Summer Creek were rated as high priority. Medium priority projects are replacing inadequate culverts along tributary streams. The Fanno Plan recommended that culvert replacements should be evaluated for the need of fish passage as required by the Endangered Species Act. A number of low priority projects were recommended, with two bridge replacements on Ash Creek included. Funding for these projects is available through the Storm Sewer Fund.

In addition to the operation and maintenance of the existing stormwater system, the City is responsible for adopting land use policies and regulations that implement statewide planning and land use goals to protect water quality and habitat. Some key areas include the protection of resources and ecosystem function, minimizing the amount of stormwater run-off associated with new development and impervious surfaces, and reducing pollutants entering the surface water system from stormwater infrastructure. Although CWS does not have land use authority, they have been involved in reducing the impacts of stormwater by developing design and construction standards that are implemented by the City. The standards outline appropriate stormwater infrastructure and design that is needed to accommodate new development. The design and construction standards address topics such as water quantity and quality facilities, protection of sensitive areas, and many more.

Since 1991, CWS has required all stormwater to be pretreated before being discharged into any surface water. In addition, the majority of new development is required to construct water quantity facilities to reduce peak flows. To ensure stormwater infrastructure is meeting the design and construction standards, a Public Facility Permit is required by the City as part of the development review process. This function is outlined in the IGA between CWS and Tigard and is carried out by a city engineer.

Funding for the stormwater system is generated from three sources. The first is from System Development Charges (SDCs), also known as in-lieu-of-connection fees, that are assessed on new developments that cannot provide their own water quantity and quality facilities. The money is placed in the Storm Sewer Fund, which is managed by CWS and used for capital projects included in plans formulated by CWS. The second is connection fees that are assessed during the building permit process. Connection fees are only required when water quality or quantity facilities are not available. Finally, the Surface Water Management Fee is a monthly charge that is collected on utility bills. The City keeps 75% of this fee for operations and maintenance of the stormwater infrastructure.

WASTEWATER SERVICES

The applicable rules, statutes and plans that impact wastewater services within the City include:

1. Clean Water Act
2. Oregon Revised Statute 468b: Water Quality
3. Oregon Administrative Rule 340
4. Clean Water Services Collection System Master Plan
5. Clean Water Services Design and Construction Standards
6. Tigard Community Development Code

Wastewater services within Tigard are managed through an agreement between the City and CWS. The agreement assigns the City to enforce design and construction standards, rules and regulations, and rates and charges governing the use of, and connection to, the wastewater system. In return, CWS acts as the regional wastewater authority that provides, owns, and maintains sewer lines with a diameter of 24 inches or greater (the City owns less than 24 inch lines), as well as pump stations and treatment facilities. CWS is also responsible for the planning of wastewater collection in the Tualatin River basin.

The CWS Collection System Master Plan Update (2000) is the current plan for wastewater collection in the Tualatin basin, including the City of Tigard. The primary focus of the plan was to analyze all sanitary sewer lines at least ten inches in diameter and eight inch lines with known capacity problems. Fifteen inch diameter or greater trunk lines required to serve areas without service were also identified. The analysis found that all existing lines within the City of Tigard have adequate capacity to accommodate anticipated growth. This means that any new lines will be the responsibility of the City as no 24 inch or greater pipes are necessary. An update to the Collection System Master Plan is scheduled for completion in 2007.

In order to meet service demands of residents, the City evaluates adequacy of capacity and has also developed the Sanitary Sewer Facility Plan Map. The evaluations are used to prioritize projects and schedule improvements to the system through the Community Investment Program (CIP). The facility map is continuously revised and shows the locations of all current and proposed lines within the City. The map allows the City to plan for new construction and also identify developed neighborhoods not currently being served by the wastewater system. As of October 2006, there were approximately 12,671 connections to the City's wastewater system. The evaluations

The Neighborhood Sewer Extension Program was established in 1996 by the City to extend public infrastructure to unconnected neighborhoods. The program requires property owners, upon connection, to reimburse the City for a fair share of the total cost. To encourage participation, the City also established the Neighborhood Sewer Reimbursement District Incentive Program that provides options for limiting the financial burden on the property owner. There are currently 528 properties that have been identified that need wastewater services extended.

The wastewater infrastructure within the City of Tigard is either owned by CWS or the City. CWS owns and operates the Durham Wastewater Treatment Facility. The facility is operating under the basin-wide NPDES permit and is in compliance with Clean Water Act regulations. The City has an IGA with Clean Water Services to perform management and maintenance tasks on City-owned wastewater infrastructure to ensure continued compliance with the regulations. Current maintenance programs outlined in the IGA are shown in Table 2-1 and apply to the 160 miles of wastewater mainline (6 to 21 inches) owned by the City.

In addition to the operation and maintenance of the existing wastewater system, the City is responsible for implementing the CWS design and construction standards. Land use applicants are required to obtain a Public Facility Permit when connecting to City owned wastewater infrastructure and must comply with the design and construction standards as part of the development review process. This function is outlined in the IGA between CWS and Tigard and is carried out by a city engineer.

Table 2-1. Scheduled Maintenance of Wastewater System

Program	Cycle
Video Inspection of Pipe Interiors	7 years
Line Cleaning and Repair	3 years
Manhole Inspection/Rehabilitation	3 years

Source: CWS/Tigard IGA

Funding for the wastewater system is generated from three sources. First, developers finance the construction of new sewer lines needed to service their new developments. Secondly, during the building permit process a connection fee is collected by the City. Most of the fee is transferred to CWS, but a portion of the fee is retained by the City for system improvements. Finally, the monthly sewer service fee is collected on the utility bill and a portion is retained by the City for operations and maintenance of the wastewater system.

WATER DISTRIBUTION SERVICES

The applicable rules, statutes and plans that impact water distribution services within the City include:

1. Oregon Revised Statute 448 & 536
2. Oregon Administrative Rule 333 & 309
3. City of Tigard Water Master Plan - 2000
4. Tigard Community Development Code
5. Water Operation Manual – City of Tigard Water Division

The City of Tigard Water Division provides water to most of the City's residents. It also supplies the City of Durham, King City, and the Bull Mountain area of unincorporated Washington County which is represented by the Tigard Water District. The northeast corner of the City is supplied water by the Tualatin Valley Water District (TVWD), which operates independently from the City Water Division. The provision of water services in the City by two different entities is the result of Tigard expanding its boundaries through annexation. The service areas are shown on Map 3-1.

The TVWD is governed by a five-member Board of Commissioners and operates under the TWVD Water Master Plan/Management Plan (2000). The plan is currently undergoing an update process that will be completed in Spring 2007. To implement the plan, TVWD has developed Water System Standards, rules and regulations, and uses a Five-Year Capital Projects Program for direction. TVWD water supply is purchased from the City of Portland under a 10-year contract signed Summer 2006. Additional water comes from the Joint Water Commission (JWC), which is a governmental water purveyor created by the cities of Hillsboro, Forest Grove, Beaverton, and the TVWD. There are currently 24 covered reservoirs in the TVWD system that can store 53 million gallons of water. Tigard has no role in the operation or management of TVWD, but has collaborated with them on long-term supply studies and is also capable of sharing water in emergency situations.

The City of Tigard Water Division provides potable water to approximately 55,990 people through approximately 17,300 residential, commercial, and industrial service connections. The Tigard Water District was the original supplier, but the City took over the system in 1994. During the transfer of supply

responsibilities, an IGA created oversight for the water system through the Intergovernmental Water Board (IGWB), which consists of a member from Tigard, Durham, King City, Tigard Water District, and one at-large member. The IGWB advises Tigard City Council on issues relating to rate setting and water supply. The IGWB was created as a result of the City supplying water outside of its boundaries.

The Water Distribution Hydraulic Study (2000) is the current master plan for the City water supply system. The study provides direction for system improvements and three feasibility studies must be completed before an update is performed:

- Joint Water Supply System Analysis with Lake Oswego
- Willamette Water Supply Consortium
- Joint Water Commission Feasibility Study

The three feasibility studies will help to provide direction for the City's long-term supply options.The City owns and operates the water distribution system under license from the Oregon Department of Human Services (DHS) and the Oregon Water Resources Department (ORWD). As a requirement of the license, a sanitary survey is performed every three years by DHS. The latest survey was July 2006 and the City water system passed with marks of good operating conditions, good staff, and a well-maintained system.

Current Supply

The City of Tigard does not own a water source capable of meeting the current and future demands of its residents. In order to meet demand, Tigard purchases nearly 90% of its water from wholesale water providers such as the Portland Water Bureau (PWB). The PWB manages the Bull Run Watershed, a surface water supply, located in the Mount Hood National Forest. In cases of emergency and/or high demand, the PWB also maintains groundwater wells located along the Columbia River. The City signed a 10-year agreement in Summer 2006 to continue purchasing water from PWB. In addition, the City purchases water from the City of Lake Oswego, which draws its water from the Clackamas River Basin.

During periods of high water demand, the City can supplement its supply with water from City-owned aquifer storage and recovery (ASR) wells and native groundwater wells. Additional supply is available for purchase from the Joint Water Commission (JWC). Water from the JWC is delivered via the City of Beaverton system, making it Tigard's only fluoridated supply.

In 2005, the Oregon Departments of Human Services and Environmental Quality conducted a source water assessment on Tigard's groundwater wells. Within the Tigard water service area, 50 sites were identified as potential sources of drinking water contamination if managed improperly.

The City also has system inter-ties with Beaverton, Tualatin, and the Lake Grove Water District that allow the City to supply them water under emergency conditions.

Current Storage

The City of Tigard's water system contains 13 reservoirs with a total combined storage capacity of

Table 3-1. City of Tigard Water Storage Reservoirs

Name	Capacity (mg)	Overflow Elevation (ft)	Pressure Zone
High Tor A	1.10	713	713-foot
High Tor B	1.00	713	713-foot
High Tor C	0.20	713	713-foot
10 MG	10.00	475	410-foot
Reservoir #4	1.00	417	410-foot
Baylor St. A	1.00	416	410-foot
Baylor St. B	1.10	416	410-foot
Reservoir #2	0.28	413	410-foot
Reservoir #3A	0.80	412	410-foot
Reservoir #3B	2.50	412	410-foot
Reservoir #1A	1.00	410	410-foot
Reservoir #1B	1.00	410	410-foot
Menlor	3.50	410	410-foot

Source: Tigard Water Division

approximately 24.5 million gallons. Table 3-1 presents a summary of the City's storage reservoirs. The City is also in the planning stages of constructing a three million gallon underground reservoir on a recently purchased piece of property along Bull Mountain Road. The reservoir site may also double as a park in the future.

Current Distribution

The City of Tigard's water distribution system contains eight pump stations, which are presented in Table 3-2. The pump stations help to distribute potable water to residents around the City.

Table 3-2. City of Tigard Pump Stations

Name	Horsepower	Capacity (gpm)	Supply To
Canterbury Pump Station	50	1,000	550-foot High Pressure Zone
ASR-1 & Reservoirs	50	1,000	
Pump Station #2	100	2,000	10 MG Reservoir
	150	1,400	High Tor Reservoirs
SW 132nd Ave Pump Station	50	350	High Tor Reservoirs
	50	350	
Transfer Pump Station	200	2,000	High Tor Reservoirs
ASR-2 & Reservoir	350	1,736	10 MG Reservoir
High Tor Pump Station #1	25	800	713-foot High Pressure Zone
	25	800	
High Tor Pump Station #2	25	800	713-foot High Pressure Zone
	25	800	
	25	800	
Bonita Road Pump Station	100	1,755	410-foot Pressure Zone
	100	1,755	
	100	1,850	
Hunziker Pump Station	30	1,400	410-foot Pressure Zone

Source: Tigard Water Division

The water service area water distribution system is also composed of various pipe types in sizes up to 36 inches in diameter. The total length of piping in the service area is approximately 209 miles. The pipe types include cast iron, ductile iron, steel and copper. The majority of the piping in the system is cast and ductile iron piping. Table 3-3 presents a summary of pipe lengths by diameter.

Table 3-3. City of Tigard Pipe System

Pipe Diameter (inches)	Estimated Length (miles)
4-inch or less	4
6-inch	62
8-inch	65
10-inch	2
12-inch	49
16-inch	9
24-inch	7
36-inch	1
Total Length	209 miles

Source: Tigard Water Division

Current Demand

The Water Division has identified a number of differing methods for calculating water consumption in the service area. Each has its pros and cons, but all methods show a decrease in total consumption and per capita consumption from the period 2001 to 2005. Table 3-4 shows total consumption based on the City's Utility Billing database. Table 3-5 shows the number of accounts that were receiving water from the City.

Table 3-4. Total Water Consumption (MG) - Tigard Service Area

Type of Account	2001	2002	2003	2004	2005
Commercial	338	343	341	327	316
Industrial	20	26	19	18	15
Irrigation	64	73	74	70	63
Multi-unit	473	486	444	458	441
Hydrant	0	0	2	13	3
Residential	1,240	1,292	1,315	1,301	1,254
Total (MG)	2,135	2,220	2,195	2,186	2,093

Source: Tigard Water Division

Table 3-5. Total Number of Accounts - Tigard Service Area

Type of Account	2001	2002	2003	2004	2005
Commercial	636	640	644	646	648
Industrial	14	14	14	14	14
Irrigation	138	147	152	163	177
Multi-unit	594	596	592	593	595
Hydrant	0	0	12	7	6
Residential	14454	14713	15087	15363	15715
Total	15,836	16,110	16,501	16,786	17,155

Source: Tigard Water Division

Using the Utility Billing data and population served by the Tigard Water Division, the gallons per capita per day (gpcd) can be calculated. Table 3-5 shows the results.

Table 3-6. Per Capita Water Consumption - Tigard Service Area

	2001	2002	2003	2004	2005
Population	50,750	51,798	52,846	53,894	54,942
Multi-unit & Residential Consumption (MG)	1,713	1,778	1,759	1,758	1,695
Multi-unit & Residential gpcd	**92**	**94**	**91**	**89**	**85**
Total Consumption of All Uses (MG)	2,135	2,220	2,195	2,186	2,093
Total gpcd	**115**	**117**	**114**	**111**	**104**

Source: Tigard Water Division

Repairs made in water line leaks, rising costs, and the Water Division's Conservation Program have contributed to the decrease in per capita water use. Both the Conservation Program and rising costs could have a continued effect on water demand capacity.

Future Demand

The Water Division produced the Water Demand Forecast Report (Sept 2006) that used projected population growth and anticipated per person water demand to forecast future demand. The data used for the forecast includes:

- 10 year period average dwelling unit per acre density is 6.8 units/acre
- 5 year period average dwelling unit per acre density is 8.2 units/acre
- State Metropolitan Housing Rule requires Tigard to provide for and overall dwelling unit per acre density of 10 units/acre
- The number of units is multiplied by the average population density of 2.5 persons per unit (Washington County)
- Long Range Planning has identified 570 buildable acres within Tigard/Bull Mountain Area; 32 buildable acres within Durham and 107 buildable acres within King City; Total buildable acres is estimated at 709 acres (build out)
- Year 2005 calculated water demand is 110 gallons per person per day average
- Current 5 year average water demand is 120 gallons per person per day average

The results of the forecast are:

- Population growth from 12,053 to 17,725 persons (17,725 population increase would require all available lands built to 10 unit/acre density) within the next 10 years is possible
- Water demand per person could range from 110 to 120 gallons per capita per day
- Annual water demand could range from 2,732 million gallons to 3,229 million gallons (3,229 MG is based on the max density of 10 unit/acre)
- Average Daily Demand could range from 7.5 mgd to 8.8 mgd (8.8 mgd maximum based on 10 unit/acre density and 120 gpcd)
- Peak Demand Day estimates range from 15.6 mgd to 18.4 mgd (18.4 mgd maximum based on 10 unit/acre density and 120 gpcd)
- 3 Day Peak Demand estimates range from 15.0 mgd to 17.7 mgd (17.7 mgd maximum based on 10 unit/acre density and 120 gpcd)

Funding

The City of Tigard Water System is set up as an enterprise fund. The budget needs no money from the City general funds and operates based on solely on revenue the Water System creates. System Development Charges for new construction and connections, and rates for water consumption are the two main sources of revenue for the budget.